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came unstable; then there was an explosion, and particles of matter were shot off at great velocities. There was a series of such explosions, due to atomic, not molecular, changes, and resulting in the formation of a series of transition elements. A mass of radium left to itself must therefore throw itself away; probably in about 2,000 years its radio-activity would fall to half value, and after 50,000 years it would cease to exist. It was therefore to be supposed, since radium was produced from minerals more than 50,000 years old, that it was being itself produced from something else, and was itself a transition element. A year ago to find evidence for this point of view did not seem a very promising task, but since then a great deal had been done. In the self-destruction of radium two things must be produced that were not radio-active—the  $\alpha$ -ray and the final product. Now helium was always found associated with radium-minerals, and the suggestion that that gas was one of the products had been confirmed by Sir William Ramsay, who had shown that the emanation was able to produce helium from itself. Here there was apparently a definite case of transmutation, though not precisely of the kind sought after by the alchemists, but there was no evidence as yet that matter in general, apart from the radio-active bodies, was undergoing changes of this nature. Radium was distributed very widely over the earth; in fact, was present everywhere, though in exceedingly minute quantities. The question was thus suggested—How much heat were these minute quantities of radium able to provide, and could they account for the gradual increase of temperature found as we went deeper into the earth? The lecturer himself believed that the amount of radium present, uniformly distributed, would be sufficient to account for all the heat lost from the earth and would explain the temperature-gradient as measured to-day. In that case the date, as calculated by Lord Kelvin, when this globe would have so far cooled as to be uninhabitable might possibly be postponed for a few million years, and an end

put to the troubles of the biologists and geologist about a little extra time in the past.

#### SCIENTIFIC NOTES AND NEWS.

THE International Association of Academies met at London at the end of May as the guest of the Royal Society and the British Academy. The National Academy was represented only by its British foreign members. No information concerning the scientific work of the association appears to have been made public.

AT a recent meeting of the Board of Managers of the New York Botanical Garden, Dr. D. T. MacDougal was advanced from the post of director of the laboratories to that of assistant director of the institution. Dr. W. A. Murrill was appointed assistant curator in charge of the fungi to take the place of Professor F. S. Earle, who recently resigned to take the position of director of the Estacion Agronomica of Cuba.

DR. E. L. GREENE, head of the Department of Botany of the Catholic University of America, has resigned to accept a position in the Smithsonian Institution.

SIR WILLIAM RAMSAY was elected an honorary member of the Bunsen Gesellschaft, at the recent meeting in Bonn.

SIR WILLIAM HUGGINS has been elected an honorary member of the Royal Philosophical Society of Glasgow.

M. BIGOURDAN has been elected a member of the Paris Academy of Sciences in the section for astronomy.

DR. E. STRASBURGER, professor of botany at Bonn, has been elected a foreign member of the Academy of Sciences at Christiania.

THE New York *Evening Post* states that Professor Henry R. Mussey, of the University of Pennsylvania, has been engaged by the Carnegie Institution to make a special study of the iron industry in the United States.

DR. H. AUSTIN AIKINS, professor of philosophy in Western Reserve University, has sailed for Europe on leave of absence for the coming year.

MR. AND MRS. T. D. A. COCKERELL will spend the summer in England; upon their return to

Colorado in September, Mrs. Cockerell will take the position of teacher of biology and physiography in the State Preparatory School at Boulder. In this work she will be assisted by Mr. Cockerell, who will also conduct a research laboratory in the University of Colorado.

PROFESSOR T. STEINMANN has returned to Freiburg from geological and paleontological explorations in Bolivia.

FOREIGN papers report that Dr. Gottfried Merzbacher, who has been engaged for two years on a scientific expedition in the Thian-shan Mountains, in Central Asia, has returned to Munich with many objects of geological, paleontological, zoological and botanical interest.

It is reported that Lieutenant Peary has chartered the sealer *Eagle*, at St. John's, Newfoundland, for a cruise to Littleton Island, from July to September, in preparation for a four years' stay in the Arctic regions.

DR. ALÈS HRDLICKA, of the U. S. National Museum, has been elected a corresponding member of the Czecho-Slavonic Ethnological Society of Prague.

DR. BURTON E. LIVINGSTON, assistant in the Department of Botany, of the University of Chicago, has been awarded the Walker prize by the Boston Society of Natural History for a paper on 'Ionic Stimulation in Plants.'

THE Council of the Geological Society of London has awarded the Daniel Pidgeon fund to Mr. Lindsall Richardson.

MR. PERCY WILSON, administrative assistant in the New York Botanical Garden, has accepted the position of assistant botanist of the Estacion Agronomica of Cuba. Mr. W. T. Horne, fellow in botany in Columbia University, has been appointed assistant pathologist in the same institution.

THE Rede lecture at Cambridge will be delivered on June 11, by Dr. J. A. Ewing, F.R.S., upon 'The Structure of Metals.'

WE learn from *Nature* that a mathematical society of Vienna has been organized, the meetings of which are to be held monthly. The officers are Messrs. G. von Escherich (president), E. Müller and W. Wirtinger

(vice-president), A. Lampa (secretary), and A. Gerstel (treasurer).

THE death is announced of Senator Gaetano Georgio Gemmellaro, the Italian geologist; of Professor Lengemann, who held the chair of mining in the Technical Institute at Aachen, and of Mr. Frank Rutley, the British geologist.

THE Weights and Measures (metric system) Bill before the British parliament has been read a third time and passed by the House of Lords.

THE Chicago Academy of Sciences has secured the collection of Lower Coal Measure plants made by Dr. John H. Britts, of Clinton, Iowa. The collection contains many species, named by Lesquereux, besides numerous cotypes of species, described by David White in Monograph 37, U. S. Geological Survey, on the 'Fossil Flora of the Lower Coal Measures of Missouri.' The collection was obtained through the generosity of Mr. Francis S. Peabody, of Chicago.

FIVE hundred mechanical engineers, representing the United States and foreign countries, were present on May 31 at the opening of the forty-ninth annual meeting of the American Society of Mechanical Engineers, which was a joint meeting with the Institution of Mechanical Engineers of Great Britain. Addresses were made by Mr. Ambrose Swasey, president of the American society, and Mr. J. P. Hartley Wicksteed, president of the English organization.

THE Philadelphia Botanical Club and the Torrey Botanical Club will hold a joint field meeting at McCall's Ferry, Pennsylvania, in the valley of the Susquehanna River, July 2 to 9, 1904, which all botanists are cordially invited to attend. Excursions will be made from this point as a center, to points in the vicinity, returning each day; botanists can, therefore, conveniently take part in the meeting by arriving at McCall's Ferry any afternoon during the week. Informal evening conferences will be held for the discussion of topics that may be brought forward. Fares to McCall's Ferry are as follows:

Philadelphia to McCall's Ferry and return...\$3.36  
 New York to McCall's Ferry and return... 6.96  
 Washington to McCall's Ferry and return... 4.06  
 Hotel charges at McCall's Ferry are \$1.25 per day.  
 Guides: Messrs. Stewardson Brown and Jos. Crawford.

AN International Maritime Congress was held at Lisbon in the hall of the Geographical Society from the twenty-second to the twenty-eighth of May. The program of subjects was as follows:

I. *Oceanography and Hydrography*.—Bathymetric charts. Last cruise of the Princess Alice yacht. Lithobiologic charts. Unification of the scale of marine charts.

II. *Meteorology*.—The north Atlantic and forecasts of the weather in Western Europe.

III. *Territorial Waters*.

IV. *Congresses and Conferences*.—Summary of the work relative to maritime questions.

V. *Institutions for assistance to seamen*.

VI. *International maritime statistics*.

VII. *Panama interoceanic canal*.

VIII. *International Maritime Union Convention*.—Concordant measurement. Load line. Quay dues on the net or the gross tonnage. Lanes for ship routes. Signals in fogs at sea. Navigation rules. The prevention of collisions. Organization for life saving on board. Lighting and buoying of coasts. Condemnation of ships by experts. General average. Non liability clauses in Bills of Lading.

IX. *Yachting*.—International unification of measurement and rules for racing. Decimalization applied to navigation.

X. *Sea Fishing*.—Steam trawlers. The sardine question.

XI. *Wireless telegraphs and telephones*.

XII. *Port improvements and manutention*.

The International Maritime Association, under whose auspices this congress was held has a permanent office at 3 rue des Mathurins, Paris.

THE captain of the ship *Godthaab*, which arrived from Greenland, at Copenhagen, on May 24, reports that the Danish Polar Expedition, led by the author Mylius Erichsen, left Saunders Island, where the explorers had lived for a long time among the Eskimo in the native fashion, on January 20, and, traveling by sledges, safely reached Upernivik, in West Greenland. Afterwards they proceeded to Umanak. The expedition will probably come home in the autumn.

*Nature* states that a series of prizes is offered by the mathematical and natural science section of the Jablonow Society of Leipzig for themes connected with the following subjects: For 1904, the chemical differentiation of rock magmas; for 1905, the causes of plasmic currents in vegetable cells; for 1906, the analogues of Bernouilli's numbers in the study of elliptic functions; and for 1907, the laws of photoelectric currents. Full particulars are obtainable from the secretary, Professor Wilhelm Scheibner, 8 Schletterstrasse, Leipzig. The Royal Academy of Sciences of Madrid offers for 1905 a prize for the best essay written in Spanish or Latin on the following subject: 'A complete study of a special class of singular integrals arising from differential equations for which the values of the derived functions become indeterminate when certain relations exist between the simultaneous values of the principal variables.'

THE *Monthly Weather Review* reports that by the joint efforts of the Italian Alpenverein, the Duke of Abruzzi, the Minister of Agriculture for Italy, and Queen Margaritha, a geophysical observatory on the summit of Monta Rosa, at an altitude of 4,560 meters, has been erected. It is the highest in Europe, except that of Vallot, on Mont Blanc, and higher than the station on Pike's Peak formerly occupied by the Weather Bureau. The regular observational activity will begin this summer. It will be occupied in the winter time as well as in the summer if the severity of the weather does not prevent. Both the observatory and the hut of refuge for mountaineers will be accessible, not only to Italian but to foreign students who wish to carry on geophysical investigations. The meteorological observations are expected to be of especial importance in connection with the simultaneous international balloon ascensions. Italy now possesses three mountain observatories, namely, Monta Rosa, 4,560 meters; Ætna, 2,942 meters; Cimone, 2,162 meters.

*Nature* says of the late Professor His: "Professor Wilhelm His, whose death was announced from Leipzig on May 1, at the age of seventy-three, altered and extended our knowledge of human anatomy more than any

man of his time. He discovered and wrote the history of the human body during the first and second months of conception, and thus filled in what, until his time, was almost a blank. He introduced more accurate methods of studying the form and relationships of the various organs of the body. Pupils went to him from all parts of the earth and carried back to their native universities the quiet, honest spirit of investigation, the complete methods and the accurate technique His had introduced in his laboratory at Leipzig. His influence to-day is world-wide; it is especially evident in the remarkable progress in embryological research made recently in the United States. As His entered to lecture one was struck by the absence of those bodily features one expects in a German professor. He was a Swiss by birth and education, having been born at Basel in 1831; in appearance he might have been an Englishman. His narrow, longish head, black hair, regular profile, long sallow face, and nervous temperament indicated his descent from a Celtic stock. He taught quietly, clearly and concisely, illustrating his subject as he spoke by marvelous drawing on the blackboard. He relegated lady-students to the back-bench. Long after the university doors were shut, a light could be seen in the window of his private room, for to him work was also amusement.

THE Cumberland Gap coal field of Kentucky and Tennessee is growing steadily in importance, although most of this area, which forms part of the eastern edge of the Appalachian coal field in southeastern Kentucky and northern Tennessee, is now without transportation facilities. The production of coal from the vicinity of Middlesboro has reached an annual output of from 600,000 to 1,000,000 tons. Bennett Fork has become a mining town for a continuous distance of five miles, and Stony Fork, up which a railroad is just completed, promises soon to become equally active. These and other evidences of rapid development, together with the fact that no government report has ever before been published about Cumberland Gap coals, give especial interest and value to a paper written by Mr. George H. Ashley about this field. This paper is in-

cluded in a bulletin (No. 225) entitled 'Contributions to Economic Geology, 1903,' recently published by the U. S. Geological Survey for gratuitous distribution. Mr. Ashley's paper is merely a preliminary abstract of a more detailed report, which will be prepared under a cooperative arrangement made between the U. S. Geological Survey and the state of Kentucky. This report will fill several hundred pages and will be fully illustrated with appropriate plates, coal sections and maps.

THE *Journal of Philosophy* summarizes the program for the season of 1904 of the Glenmore Summer School of the Culture Sciences, founded in 1889 by Thomas Davidson. The session will begin on July 11 and extend to September 3. Lectures are announced for Mondays, Tuesdays, Thursdays and Fridays at 11 A.M., and Sundays at 11:30 A.M. There will be informal discussions relative to the subjects of the lectures of each week on Wednesday evenings. The following lectures are announced: weeks beginning July 11 and 18, Charles W. Bakewell, Ph.D., of the University of California, on 'The Philosophy of Plato'; week beginning July 25, Leslie Willis Sprague, lecturer for American University Extension Society, Philadelphia, on 'Ralph Waldo Emerson'; week beginning August 1, Charles G. Child, Ph.D., L.H.D., of the University of Pennsylvania, on 'The Making of English Literature'; week beginning August 8, Hon. Chester Holcombe, A.M., Ex-Minister to China, Lowell Institute Lecturer, 1902, on 'The Religion and Literature of China'; week beginning August 15, Felix Adler, Ph.D., of Columbia University, on 'The General Theory of Social Ethics,' and Edward G. Spaulding, Ph.D., of the College of the City of New York, on 'Dogmas in Philosophy and Science'; week beginning August 22, Alvin S. Johnson, Ph.D., of Columbia University, on 'Some Aspects of the Labor Question'; week beginning August 29, J. Mark Baldwin, Ph.D., LL.D., of Johns Hopkins University, on 'Social Psychology.' There is a possibility that a few additional lectures may be given during the summer by Professor W. T.

Brewster, Ph.D., of Columbia University, and by Professor Lightner Witmer, Ph.D., of the University of Pennsylvania, on literature and psychology respectively. For particulars of the session, Professor Stephen F. Weston, of Yellow Springs, Ohio, should be addressed.

#### UNIVERSITY AND EDUCATIONAL NEWS.

MRS. AMANDA W. REED, has provided in her will for the foundation of an institution at Portland, Ore., to be known as Reed Institute, in memory of her husband, the late Simon G. Reed. The bequest will amount to about \$2,000,000. Her will specifies that the institute shall combine instruction in the fine arts and sciences and manual training, and that it shall be conducted with especial regard to the needs of young men and women compelled to earn their own living.

PRESIDENT B. I. WHEELER, of the University of California, president of the department of Higher Education of the National Educational Association, has completed the program for the session of the department which is to be held at the St. Louis Exposition on June 29 and July 1. The two subjects chosen for discussion are 'Coeducation in Relation to Other Types of College Education for Women' and 'The Present Tendencies of College Athletics.' The speakers with their subjects include: June 29—President Charles F. Thwing, Western Reserve University, 'The Women's Annex Versus Coeducation'; President Charles W. Dabney, University of Tennessee, 'The Experience of the South in Regard to Coeducation and Other Forms of Education for Women'; President R. H. Jesse, University of Missouri, 'Coeducation as It Has Been Tested in the State Universities'; President G. Stanley Hall, Clark University; President James B. Angell, University of Michigan. July 1—Chancellor E. Benjamin Andrews, University of Nebraska, 'The General Tendency of College Athletics'; President W. H. P. Faunce, Brown University, 'College Athletics'; Chancellor Frank Strong, University of Kansas, 'The Highest Standards of College Athletics—Outright Amateurism.'

THE College Entrance Examination Board will hold examinations during the week, June

20 to 25, at about one hundred and fifty points throughout the United States and at London, Paris, Geneva, Strasburg, Dresden and Frankfurt. The readers in the sciences are: *Mathematics*—Professor R. W. Prentiss, Rutgers (chief reader); Professor C. E. Biklé, Teachers College; Miss Elsa Bowman, Brearley School; R. H. Bright, Paterson High School, H. H. Denio, Collegiate School; C. S. Forbes, Columbia; J. R. Gardner, Irving School; W. A. Johnson, Hasbrouck Institute; E. H. Koch, Jr., Mackenzie School, Dobbs Ferry, N. Y.; W. E. MacDonald, Massachusetts Institute of Technology; R. Morris, Rutgers, Miss Gertrude Smith, Vassar; Professor Virgil Snyder, Cornell; Miss Roxana H. Vivian, Wellesley; H. E. Webb, Stevens Preparatory School, Hoboken. *Physics*—Professor A. W. Goodspeed, Pennsylvania (chief reader); Professor J. M. Jameson, Pratt Institute; Dr. G. B. Pegram, Columbia. *Chemistry*—Professor J. F. Norris, Massachusetts Institute of Technology (chief reader); Professor C. M. Allen, Pratt Institute; Dr. V. J. Chambers, Columbia. *Botany*—Professor W. W. Rowlee, Cornell (chief reader); Miss Elsie Kupfer, Wadleigh High School. *Geography*—Professor R. E. Dodge, Columbia (chief reader); W. W. Clendennin, Wadleigh High School.

THE Rev. Samuel Black McCormick, a Presbyterian clergyman, since 1897 president of Coe College, at Cedar Rapids, Ia., has been elected chancellor of the Western University of Pennsylvania.

DR. F. G. DONNAN, lecturer in chemistry in the Royal College of Science, Dublin, has been elected to the chair of physical chemistry recently founded by Sir John T. Brunner in the University of Liverpool.

AT Cambridge Mr. W. J. Sell, F.R.S., and Mr. H. J. H. Fenton, F.R.S., are to be appointed university lecturers in chemistry, and Mr. A. Harker, F.R.S., a university lecturer in petrology.

DR. O. ASCHAN has been appointed professor of chemistry in the University of Helsingfors.

DR. GEORGE LANDSBERG, of Heidelberg, has been called to an associate professorship of mathematics at Strasburg.